DEVELOPMENT OF LESSON PLAN OF CONTEXTUAL MATHEMATICS IN ELEMENTARY SCHOOL

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ABSTRACT

The purpose of the research is to develop contextual learning of mathematics in elementary schools, and specifically, directed to develop a lesson plan of contextual math in elementary school. The research uses research and development approach, namely, a one-year study with a qualitative research design. Headmaster, classroom teacher of fifth grade and students of elementary schools Taman Muda Ibu Pawiyatan dan Taman Muda Pawiyatan, Jetis, Yogyakarta are assigned as informants. Data are collected by using observation, in-depth interviews, and documentation. The data are analyzed by using qualitative analysis of flow method. Data validity is examined by using methods and sources triangulations. Results of the research were development of the lesson plan began with designing: (1) goals of learning based on analyses of Competence Standards and Basic Competences; (2) issue situations resolved by student; (3) organization of resources and logistics; (4) authentic assessment procedure and technique of the learning processes and outcomes; and (5) steps of learning activities. Preparation of an evaluation study of mathematics, namely evaluations of the learning process and the learning outcomes were performed authentically based on cognitive, psychomotor, religious, and social aspects. Assessment of the process was carried out to assess participation of students during the learning process. Assessment of the results was based on works of students in worksheet problem solving, controlled exercise, independent practice, and independent tasks.

Keywords: authentic, development, mathematics, plan

Introduction

Mathematics learning of elementary schools Taman Muda Yogyakarta is, largely, still teacher-centered. It is referred to as an activity of teaching, not a learning activity. Teacher tends to use lecture, demonstration, assignments and exercises methods. Related to the dominant teaching activity, a question arises, namely is the mathematics learning activities of elementary schools Taman Muda, Jetis, Yogyakarta effective? Sutama (2011: 28) stated a mathematics learning is not effective because: (1) teachers’ understanding was inadequately documents of Content Standards, the teachers experienced trouble in formulating indicators based on by Standard of Competences and the Basic Competency; (2) the math learning was largely text book oriented and abstract in nature, and insufficiently linked to daily life of students; and (3) usually, teachers were paying less attention to prior knowledge of students and they used less varied methods.
Based on ideas above, teacher should focus on management of the learning by using strategies as needed, namely, to develop contextual mathematics learning. Contextual learning can stimulate insights of children in order to respond environment (Johnson, 2009: 15).

What is reality on the ground? There is a general impression that teachers implement SBC (School-based Curriculum) with inadequate competency. Most of them are still predicated as SBC applicator and they perform activities that are a routine matter. Teachers are not ready to face various changes and they have limited access to cutting-edge materials and also limited insights and learning skills. They perform tedious and meaningless learning. More miserably, the teachers use books as a main source of the learning outcomes assessment.

The one-year study is generally intended to develop contextual mathematics learning in elementary schools Taman Muda Kota Yogyakarta, and specifically, directed to develop a mathematics lesson plan of elementary school.

**Research Methods**

The research, as a whole, uses research and development approach. The one-year study uses a qualitative research design. Location of the research is elementary schools Taman Muda Yogyakarta. Data sources include informants, documents, and places or events. The informants consist of headmaster, fifth grade teachers and students of elementary schools Taman Muda Ibu Pawiyatan and Taman Muda Jetis Yogyakarta. Data are collected by using observation, in-depth interviews, and documentation techniques. The data are analyzed by using qualitative analysis of flow method. Data validity is examined by using data method and source triangulations.

**Results and Discussion**

Prior to the learning process, teachers plan the learning translated into documents of lesson plan (RPP). Results of the study stated that the planning is main function affecting the subsequent functions. Sholeh (2007: 129-137) stated that planning is the main function that affects subsequent functions, so that a teacher should be able to prepare a written plan. The lesson plan is more likely to serve to remind teachers in preparing tools/media and controlling measures (scenario) in order to simplify the learning (Joel, 2003:4). Initial planning of the mathematics learning begins with curriculum development and review. Principles of the material preparation such as relevance, consistency, and adequacy should be paid attention in the curriculum development.

Relevance means that scope, depth, degree of difficulty and presentation sequence of the material are tailored to developmental level, intellectual, social, emotional and spiritual aspects of the learners. The learning materials should be relevant or associated with achievement of standard of competences, basic competences, and content standards. For example, if a competence expected to master by students is to memorize facts, the learning material should be taught is the facts.

Principle of consistency means constancy. A student should master a kind of basic competence, then the learning material to be taught should also include the kind. For example, the learning contained in standard of competences of understanding and using properties of arithmetic in solving the problem is divided into: (1) identify the properties of arithmetic, (2) sort the numbers, (3) determine the multiplication and division (4) perform a mixed arithmetic, (5) conduct assessment and rounding, and (6) solve a problem involving money. Because the standard of competences consists of six Basic Competences, then there are six materials to be learned, namely: (1) properties of arithmetic operations, (2) order of number, (3) multiplication and division, (4) a mixed operation of arithmetic, (5) assessment and rounding, and (6) money.

The principle of adequacy means that material being taught should be sufficient enough in helping students to master basic competences to be taught. The material taught should not be too
widespread, or too narrow. If the material is too narrow, it will less useful and even a difficulty is likely happened in achieving standard of competences and basic competences. Conversely, if it is too widespread, it would waste time and energy to learn unnecessary things.

Stage of development of initial teaching materials starts with determining principal criteria for selection of learning materials, i.e., graduate competency standards, standards of competences, and basic competences. Results of researches mentioned that in order to do learning, curriculum content is implemented in a lesson plan to produce a learning model. Bachtiar (2010: 1-11) stated that a lesson plan is translation of content of curriculum development that has been conducted in development of the curriculum in order to produce a learning model.

The teaching materials refer to achievement of standards of competences and basic competences. For example, development of material that will be conducted on Graduate Competence Standards is to understand fractions in everyday life problems-solving, the standard of competence contain the use fractions in problem solving. The Standard of Competence is translated into four basic competences, namely: (1) change fraction to the forms of percentage and decimals and vice versa; (2) sum and subtract various forms of fractions, (3) multiply and divide various forms of fractions, and (4) use fractions in comparison and scale problems. The next stage is development stages of the learning materials as described below.

The first stage is to identify aspects contained in the standard of competences and basic competences as references of the learning materials development. In identifying the aspects of standard of competence and basic competences, cognitive, affective or psychomotor aspects or domains should be determined. The cognitive aspect includes knowledge, comprehension, application, synthesis, analysis, and assessment. The psychomotor aspect includes initial, semi-routine and routine movements. Affective aspect consists of giving a response, appreciation, assessment, and internalization.

The second stage is to identify types of learning materials. Based on aspects of standard of competences, the learning material can also be divided into kinds of cognitive, affective, and psychomotor material aspects. Cognitive aspect of the learning material can be divided in detail into four types, namely: facts, concepts, principles and procedures. Type of fact material is one easily seen, such as names of objects, names of places, names of individuals, symbols, historical events, name of a part or a component of an object, list the number as well as the parts, and so forth. Materials about concept consist of an understanding/a definition, essence, core content, identification, classification, and special characteristic. Material about principles types are propositions, formulas, adagium postulates, paradigms, theorems. Material of procedure types can be flow charts, algorithm of steps in doing things orderly.

Affective aspect of the learning materials covers provision of response, acceptance (appreciation), internalization, and assessment. Material of learning belonged to attitude or value is material regarding to scientific attitudes.

Material of learning related to skills includes ability of developing ideas, choosing and using materials, using equipment, and engineering a work. Skills should be tailored to the needs of students by paying attention to talents, interests, and expectations of the students so that they are able to master of work skills (pre-vocational skills) who is integrally supported by life skills. Examples of materials containing skills in standard of competences of measuring angle, length, and weight in a problem solving, and the Basic Competences contains establishment of angle with non-standard units and units of degrees, so students perform activities of measuring angles by using a paper as a measurement sample.
The third stage is selection of appropriate or relevant learning material to the identified standards of competences and basic competences. In addition, it should be noted also that principles concerning the breadth and depth of the material. For example, a geometric material can be taught in elementary education, middle, and high, but with differences breadth and depth of the material in every level of the education. The higher level of education, the more coverage of statistical material aspects studied and also more detail every aspect is studied.

The fourth stage, selection of sources of the learning materials and then, packing the learning materials into an appropriate teaching material. Results of studies suggested that the making of lesson plan should be adjusted to conditions of school and characteristics of learners. Hasan (2011: 13-21) stated that teachers should develop their own lesson plans according to conditions of their schools and characteristics of learners and should refer to the standard process. Having determined the type of material, then the next step is to determine source of the learning material. The learning materials can be extracted from various sources such as textbooks, magazines, journals, newspapers, internet, audiovisual media, and so on.

Based on these results, it can be interpreted that the development of mathematics lesson plans is performed by Content Standard containing syllabus and adapted to conditions of schools and learners. Preparation of lesson plans is stage of planning. The writing of a lesson plan is firstly began with designing (1) objectives of learning based on analysis of Standards of Competences and Basic Competences, (2) situation of problems that will be resolved by students, (3) organization of resources and logistics, (4) authentic assessment techniques and procedures and results of learning process that will be applied, and (5) steps of learning activities.

Assessment techniques and procedures applied in the learning process are inseparable from objectives of the learning and characters demanded in solving the problems reflected in teaching materials that will be completed. Therefore, assessment applied is concerned with assessment on cognitive, affective, psychomotor, and social aspects. Assessment of the process (assessment on affective, psychomotor, and social aspects) is performed during the learning process, namely involvement and activities of students in groups, and participation of students during the learning process. Assessment of learning outcomes or cognitive aspect is based on results of students' works such as completion of work sheet and task sheet.

Steps of learning consists of preliminary, core and closing activities. First, the preliminary activity is to condition students in order to be ready to receive the learning. The activities include: (a) to deliver goals of the learning, subject matters to be learned and procedures of the learning, (b) Apperception, question-and-answer technique is used to recall previous material, (c) to provide motivations that will stimulate curiosity of students.

Second, the core activity is a stage of creating a meaning divided into three activities, namely exploration, elaboration, and confirmation activities. At the core activities, the students are demanded to be more active and the teacher as a facilitator. The sitting position of students is conditioned to a discussion one.

Third is the closing activity (consolidation). The stage containing activities of analyzing and evaluating the problem-solving process includes: (a) performing a reflection by asking students about materials they have mastered, and also ones they are not understanding clearly yet, roots of cause of non-mastery, and alternative solutions for further actions, (b) students are given assignments/homework.

Media used by the teacher came from his own teacher-made of school. Instructional media are created by the creativity of the teacher. For example, in learning KD: resolve the problems associated
with unit number, using the medium of paper, cloth, or glass. Students involved in utilizing the media in a way to try it.

Preparation of teaching materials and attention to mathematics refer to Standards of Competence and Basic Competence established through the Minister of National Education. 22 of 2006 on the Content Standards. Furthermore, determining the form of teaching materials, any material that will be taught instructional materials require different. To teach the material sometimes in accordance with demonstrations, textbook, or worksheet. For that carefulness is needed in the analysis. RPP attached with teaching materials in the form of student worksheets.

Management of student interaction, students are divided into several groups to work groups. Teachers check and assist students learning in the classroom. Interaction occurs very warm either between teachers and students, students with students. They give each other ideas and cooperation in completing the task. This is in line with the results of the study Septi (2012: 145-151), which states that the interaction that occurs in the classroom learning include interaction gives good relief with an explanation or not, ask for help and express ideas or opinions. With the interaction of active learning can increase the interest of students to follow the learning in the classroom. The results of the study stated that the absence of an active communication then a high interest in learning will not be achieved. Liberna (2012: 149-157) that deliver the active without communication from teachers and students then it will not likely be achieved interest in learning mathematics are considered monotonous.

In formulating the learning activities, there are three activities that need to be considered, namely the preliminary activities, core activities, and closing activities. Preliminary event is the initial activity in a meeting that was shown to raise up learning motivation and focus the attention of learners to participate actively in the learning process. This is in accordance with the opinion of Lynch and Dorothy (2003: 1-4), that learning is not only to transfer knowledge but the process of constructing knowledge. Learning is a process not just memorizing a concept that is so, but must learn to experience yourself. Here's an example of preliminary activities on the standard of competence (SK) 2. Understanding the properties and relationships. With essentially Competence (KD) was 2.3 menenutuka nets wake of various simple.

Achievement indicators, namely: Mention the properties of simple geometrical. Describing nets geometrical simple. Identify simple geometrical properties. Identify the parts of a simple geometrical. The results of the study said that in the process of explaining to the students would be better if it was associated with daily life. Nurhadji (2012: 1-15) conveys that to explore the potential of learners in creating good characters used to approach or contextual learning. For example is learning to get up the tube. In everyday life you often encounter objects that are shaped like a drum. For example, canned milk, canned bread, pipe, or a piece of bamboo. The forms that are called tube. The tube is a combined form a circle and curved sides. Come, learn the material more deeply tube.
These activities are adapted to everyday life. The aim is to ensure that children can easily learn the material. The results of the study Yulianti, Lester, and Yulianto (2010: 84-89) stated that in contextual learning strategy, students were able to increase interest and learning outcomes significantly. Students who studied with contextual learning strategies to understand the concepts of the material well.

At the core of the activities, it is carried out systematically through the process of exploration, elaboration, and confirmation. The results showed that the preparation of teaching plans are carried out systematically or based on the systems approach will provide a great advantage. Supri (2012: 56-65) stated that the preparation of teaching plans are carried out systematically or based on the systems approach, providing two major advantages, namely: 1). As a tool to analyze, identify, and solve problems as expected. 2). It has a good predictor and control. In exploration activities students are given the opportunity to find their own answers to questions relating to teacher nets of figures with simple (value curiosity). Some students work on these questions on the board. Sample questions:

a) Draw several models of cube nets!

b) If known nets such as picture cube (i) with pedestal (ii), which then becomes the upper side (iii), or (iv) or (v)?

![Diagram of cube nets](image)

(i) (ii) (iii) (iv) (v)

c) There are a number of pyramids on cube below?

![Diagram of cube with pyramids](image)

In the activity students observe examples of elaboration nets models shown by another friend or teacher. Students form groups consisting of 4 to 5 students to designate one of them as chairman of the group (the value of cooperation). Each group worked on worksheets provided by the teacher. The worksheet contains various properties of simple geometrical shapes. Waking up in a modest space worksheets associated with the daily lives of students. This suggests that a variety of situations that have been known to students in an environment of everyday life can be used and makes a great contribution in building understanding of the facts, concepts and principles of mathematics. The situation is imaginary or real students gained from the experience, making the learning of mathematics as a useful and meaningful activity that emphasize reasoning instead of mathematical formulas (Turmudi, 2009: 1-15).

As an example of geometrical forms is simple: wake up tube with pictures piggy bank or savings and wake beams that accompanied the image toothpaste packaging. Finish discussion, student assessment between friends in each group in a discussion about the level of seriousness on the sheet provided teachers (democracy).

In confirmation the activities, each group presents their thoughts in front of the class, while other students respond. While each group is assessing the presentations of other groups in terms of delivering
a level of clarity on the sheet provided by the teacher (of democracy). Teacher and student learning have been conducted. Teachers guide students to formulate / summarize the material that has been studied. Teachers and students ask questions about the things that have not been known (the value of curiosity).

Activities cover (end) done to put an end to the learning activities that can be done in the form of a summary or conclusion, assessment and reflection, feedback, and follow-up. The explanation is as follows. In the evaluation activities: students work on individual evaluation (values of honesty) and the students and teachers to discuss the evaluation. Here's an example of the evaluation questions.

Draw a cone! Show high, pedestal, and the artist line!

Answer:

![Image of a cone]

Reflection activities to do, the students deliver the things related to learning that he had got that day. Students noted the important things in each book. Students convey the message and impression about the learning conditions that are already underway and are looking for a solution if there is a problem with (the value of democracy and openness values). While the follow-up activities teachers can do by giving homework (homework) related to real life (the value of cooperation).

Writing lesson plans mathematics, Identity includes: school, class/semester subjects, the number of meetings; I. Standard of Competence; II. competence Association; III. Indicator; IV. objective, V. Teaching Materials; Prerequisites VI. Material ; VII. Time allocation; VIII. Media/Tools and Resources Study; IX. Learning Model; X. Step Learning: Introduction, Core Activities, Closing; XI. Assessment for Learning: Assessment processes and learning outcomes.

**Conclusion**

Formulation development begins with designing lesson plans (1) learning objectives based on the analysis of SK and KD, (2) the situation will be resolved the problems of students, (3) the organization of resources and logistics, (4) techniques and authentic assessment procedures and the results of the process of learning to be applied, and (5) steps of learning activities. Preparation of an evaluation study of mathematics, namely the evaluation process and evaluation of learning outcomes are done authentically based on cognitive, psychomotor, religious, and social. Assessment process is carried out to assess the participation of students during the learning process. Assessment results are based on the work of students in problem solving worksheets, exercises, controlled, independent practice, and independent tasks.

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Reference


